CLAIM AMENDMENTS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently Amended) A method of emulating Virtual Provide Local Area Network Service (VPLS) in an Asynchronous Transfer Mode (ATM) network, comprising the steps of:

configuring at a plurality of provider edge devices (PEs) a VPLS having a VPLS Identifier (ID);

exchanging information between the PEs indicating a respective ATM address at each PE which is associated with the VPLS; and

for each pair of PEs, establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit, wherein a first PE of the pair of PEs determines whether the first PE is to initiate the circuit, such that only one PE of the pair of PEs establishes the virtual circuit.

2. (Original) The method of claim 1 wherein at each PE, the respective ATM address associated with the VPLS is unique to the VPLS.

3. (Original) The method of claim 1 wherein a second VPLS is emulated at a plurality of the PEs, and wherein at each such PE the respective ATM address associated with the VPLS is also associated with the second VPLS.

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4.   (Currently Amended) A method of emulating Virtual Provide Local Area Network

Service (VPLS) in an Asynchronous Transfer Mode (ATM) network, comprising the steps of:

configuring at a plurality of provider edge devices (PEs) arranged in a Private Network-

Network Interface (PNNI) hierarchy a VPLS having a VPLS Identifier (ID); ~~exchanging~~

~~information between the PEs indicating a respective ATM address at each PE which is associated~~

~~with the VPLS; and~~

at each PE, generating a PNNI Topology State Element (PTSE) including a VPLS

Information Group (IG), the VPLS IG indicating the VPLS ID, an ATM address to be associated

with the VPLS, and a traffic characteristic associated with the VPLS ID and the ATM address;

flooding each VPLS IG throughout the PNNI hierarchy; and

for each pair of PEs, establishing a respective virtual circuit between the pair of

PEs using the respective ATM address of each PE as endpoints of the virtual circuit wherein the

virtual circuit comprises a traffic characteristic equal to the minimum traffic characteristic of the

pair of PEs~~wherein the step of exchanging information between the PEs comprises the steps of:~~

~~at each PE, generating a PNNI Topology State Element (PTSE) including a VPLS~~

~~Information Group (IG), the VPLS IG indicating the VPLS ID and the ATM address to be~~

~~associated with the VPLS; and~~

~~flooding each VPLS IG throughout the PNNI hierarchy.~~

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5.   (Original) The method of claim 4 wherein the step of flooding each VPLS IG throughout the PNNI hierarchy comprises the steps of:

at each PE, flooding the PTSE throughout a peer group of the PE, each peer group having a peer group leader;

at each peer group leader, receiving each PTSE generated by a PE within the peer group of the peer group leader and flooding such PTSEs throughout a parent logical group of the peer group leader;

at each peer group leader, receiving at least one other PTSE, each other PTSE containing a VPLS IG indicating an association between the VPLS ID and an ATM address, from the parent logical group of the peer group leader; and

at each peer group leader, flooding the at least one other PTSE throughout the peer group of the peer group leader.

6.   (Currently Amended) A method of emulating Virtual Provide Local Area Network Service (VPLS) in an Asynchronous Transfer Mode (ATM) network, comprising the steps of:

configuring at a plurality of provider edge devices (PEs) a VPLS having a VPLS Identifier (ID); ~~exchanging information between the PEs indicating a respective ATM address at each PE which is associated with the VPLS; and~~

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at each PE, generating a PNNI Augmented Routing (PAR) Service IG including the
VPLS ID, an ATM address to be associated with the VPLS, and a traffic characteristic associated
with the VPLS ID and the ATM address;

flooding each PAR Service IG throughout the ATM network

for each pair of PEs, establishing a respective virtual circuit between the pair of
PEs using the respective ATM address of each PE as endpoints of the virtual circuit, wherein the
virtual circuit comprises a traffic characteristic equal to the minimum traffic characteristic of the
pair of PEsthe step of exchanging information between the PEs comprises the steps of:

at each PE, generating a PNNI Augmented Routing (PAR) Service IG including
the VPLS ID and the ATM address to be associated with the VPLS; and

flooding each PAR Service IG throughout the ATM network.

7.   (Original) The method of claim 6 wherein at least one other PE uses Proxy PAR to
exchange with PEs ATM addresses to be associated with the VPLS.

8.   (Original) The method of claim 7 wherein the at least one other PE is attached to the
ATM network via an ATM link employing an ATM User Network Interface (UNI) signaling
protocol.

9.   (Original) The method of claim 7 wherein the at least one other PE is attached to the
ATM network via an ATM link employing an ATM Inter-Network Interface (AINI) signaling

protocol.

10.   (Currently Amended) A method of advertising a service having a service identifier (ID) within an Asynchronous Transfer Mode (ATM) network, the ATM network including a plurality of nodes arranged in a Private Network-Network Interface (PNNI) hierarchy, the method comprising the steps of:

at each node which supports the service, generating a PNNI Topology State Element (PTSE) including a service Information Group (IG), the service IG indicating the service ID and an ATM address to be associated with the service; and

flooding each PTSE throughout the PNNI hierarchy by generating at least one message, each message containing at least two PTSEs.

11.   (Currently Amended) A method of advertising a service having a service identifier (ID) within an Asynchronous Transfer Mode (ATM) network, the ATM network including a plurality of nodes arranged in a Private Network-Network Interface (PNNI) hierarchy, the method comprising the steps of:

at each node which supports the service, generating a PNNI Topology State Element (PTSE) including a service Information Group (IG), the service IG indicating the service ID and an ATM address to be associated with the service; and

flooding each PTSE throughout the PNNI hierarchy, wherein the step of flooding each PTSE throughout the PNNI hierarchy comprises:

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at each PE, flooding the PTSE throughout a peer group of the PE, each peer group having a peer group leader;

at each peer group leader, receiving each PTSE generated by a PE within the peer group of the peer group leader and flooding such PTSEs throughout a parent logical group of the peer group leader;

at each peer group leader, receiving at least one other PTSE, each other PTSE containing a service IG indicating an association between the service ID and an ATM address, from the parent logical group of the peer group leader; and

at each peer group leader, flooding the at least one other PTSE throughout the peer group of the peer group leader by generating at least one message, each message containing at least two PTSEs.

12.   (Currently Amended)   A method of emulating a Virtual Private Local Area Network Service (VPLS) at a Provider Edge device (PE) within an Asynchronous Transfer Mode (ATM) network, comprising the steps of:

configuring at the PE a VPLS Identifier (ID) associated with the VPLS, including associating an ATM address with the VPLS ID;

advertising the association between the VPLS ID and the ATM address to other nodes within the ATM network;

determining other ATM addresses within the ATM network which are associated with the VPLS;

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for each such other ATM address, determining whether the PE is to set up a virtual circuit

with the ATM address by comparing the ATM address of the PE with the other ATM address;

and

for each such other ATM address with which the PE determines that the PE is to set up a

virtual circuit, setting up a virtual circuit with the other ATM address.

13.   (Currently Amended)   A method of emulating a Virtual Private Local Area Network

Service (VPLS) at a Provider Edge device (PE) within an Asynchronous Transfer Mode (ATM)

network, comprising the steps of:

configuring at the PE a VPLS Identifier (ID) associated with the VPLS, including

associating an ATM address with the VPLS ID;

advertising the association between the VPLS ID and the ATM address to other nodes

within the ATM network, including advertising at least one traffic characteristic to be associated

with the VPLS ID and the ATM address;

determining other ATM addresses within the ATM network which are associated with the

VPLS;

for each such other ATM address, determining whether the PE is to set up a virtual circuit

with the ATM address; and

for each such other ATM address with which the PE determines that the PE is to set up a

virtual circuit, setting up a virtual circuit with the other ATM address wherein the virtual circuit

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comprises a traffic characteristic equal to a minimum of the at least one traffic characteristic and a second traffic characteristic associated with the other ATM address.

14.   (Original) The method of claim 13 wherein the step of setting up a virtual circuit comprises setting up the virtual circuit in conformance with the at least one traffic characteristic.

15.   (Currently Amended) A method of emulating a Virtual Private Local Area Network Service (VPLS) at a Provider Edge device (PE) that is part of a Private Network-Network Interface (PNNI) hierarchy within an Asynchronous Transfer Mode (ATM) network, comprising the steps of:

configuring at the PE a VPLS Identifier (ID) associated with the VPLS, including associating an ATM address with the VPLS ID;

advertising the association between the VPLS ID and the ATM address to other nodes within the ATM network;

determining other ATM addresses within the ATM network which are associated with the VPLS;

for each such other ATM address, determining whether the PE is to set up a virtual circuit with the ATM address; and

for each such other ATM address with which the PE determines that the PE is to set up a virtual circuit, setting up a virtual circuit with the other ATM address by sending a setup message to the other ATM address, the setup message including the VPLS ID, wherein

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the step of advertising the association between the VPLS ID and the ATM address to

other nodes within the VPLS comprises the steps of:

> generating a PNNI Topology State Element (PTSE) including a VPLS
>
> information group (IG), the VPLS IG indicating the VPLS ID and the ATM address
>
> associated with the VPLS; and

> flooding the PTSE throughout the peer group of the node.

16.   (Currently Amended) A method of emulating a Virtual Private Local Area Network

Service (VPLS) at a Provider Edge device (PE) within an Asynchronous Transfer Mode (ATM)

network, comprising the steps of:

> configuring at the PE a VPLS Identifier (ID) associated with the VPLS, including
>
> associating an ATM address with the VPLS ID;

> advertising the association between the VPLS ID and the ATM address to other nodes
>
> within the ATM network;

> determining other ATM addresses within the ATM network which are associated with the
>
> VPLS;

> for each such other ATM address, determining whether the PE is to set up a virtual circuit
>
> with the ATM address; and

> for each such other ATM address with which the PE determines that the PE is to set up a
>
> virtual circuit, setting up a virtual circuit with the other ATM address <u>by sending a setup</u>
>
> <u>message to the other ATM address. the setup message including the VPLS ID</u>, wherein

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the step of advertising the association between the VPLS ID and the ATM address comprises the steps of:

generating a Private Network-Network Interface (PNNI) Augmented Routing (PAR) Service information group (IG) including the VPLS ID and the ATM address; and

flooding the PAR Service IG throughout the ATM network.

17.   (Currently Amended) A node within an Asynchronous Transfer Mode (ATM) network, comprising: means for receiving a Virtual Private Local Area Network Service (VPLS) identifier (ID); and

a VPLS controller comprising a computer-readable medium encoded with instructions, the computer-readable medium comprising:

instructions for associating an ATM address with the VPLS ID;

instructions for advertising the association between the ATM address and the VPLS ID to other nodes within the ATM network;

instructions for determining other ATM addresses within the ATM network which are associated with the VPLS ID;

instructions for, for each such other ATM address, determining whether the node is to set up a virtual circuit with the other ATM address, the instructions for guaranteeing that only one virtual circuit is set up between the node and the other ATM address; and

instructions for, for each such other ATM address that the node determines that the node is to set up a virtual circuit, setting up a virtual circuit with the other ATM address.

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18.   (Original) The node of claim 17 wherein the node is part of a Private Network-Network Interface (PNNI) hierarchy, and wherein the instructions for advertising the association between the ATM address and the VPLS ID comprise:

    instructions for generating a PNNI Topology State Element (PTSE) including a VPLS information group (IG), the VPLS IG indicating the VPLS ID and the ATM address associated with the VPLS; and

    instructions for flooding the PTSE throughout a peer group of the node.

19.   (Original) The node of claim 17 wherein the node is part of a Private Network-Network Interface (PNNI) hierarchy, and wherein the instructions for advertising the association between the ATM address and the VPLS ID comprise:

    instructions for generating a PNNI Augmented Routing (PAR) Service information group (IG), the PAR service IG including the VPLS ID and the ATM address to be associated with the VPLS; and

    instructions for flooding the PAR service IG throughout the ATM network.

20.   (Original) The node of claim 17 wherein the instructions for advertising the association between the ATM address and the VPLS ID comprise instructions for delivering the association to a second node using Proxy PAR.

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21.   (Currently Amended) A node within an Asynchronous Transfer Mode (ATM) network, the node being part of a Private Network-Network Interface (PNNI) hierarchy within the ATM network and comprising a computer-readable medium encoded with instructions, the computer-readable medium comprising:

    instructions for receiving a service identifier (ID) identifying a service;

    instructions for generating a PNNI Topology State Element (PTSE) including a service information group (IG), the service IG indicating the service ID and an ATM address to be associated with the service; and

    instructions for flooding the service IG throughout the PNNI hierarchy by generating at least one message, each message containing at least two PTSEs.

22.   (Currently Amended) A logical group node within a Private Network-Network Interface (PNNI) hierarchy in an Asynchronous Transfer Mode (ATM) network, the logical group node having a peer group and a child peer group, and comprising a computer-readable medium encoded with instructions, the computer-readable medium comprising:

    instructions for receiving at least one PNNI Topology State Element (PTSE) from nodes within the child peer group, each PTSE including a Virtual Private Local Area Network Service (VPLS) information group (IG), each VPLS IG indicating an association between a VPLS identifier (ID) and an ATM address;

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instructions for flooding each of the at least one PTSE throughout the peer group;

instructions for receiving at least one other PTSE from other logical group nodes within the peer group, each PTSE including a VPLS IG indicating an association between the VPLS ID and an ATM address; and

instructions for flooding each of the at least one other PTSE throughout the child peer group by generating at least one message, each message containing at least two PTSEs.

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